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(54) AN ARRANGEMENT WHICH MAKES IT POSSIBLE TO DISPLACE A CAB OF A VEHICLE

VORRICHTUNG ZUM VERSCHIEBEN EINER FAHRZEUGKABINE

DISPOSITIF PERMETTANT DE DEPLACER L'HABITACLE D'UN VEHICULE

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Description

[0001] The present invention concerns an arrangement to facilitate the displacement of the driving-space of a vehicle according to the preamble of claim 1.

[0002] Such an arrangement is known from DE 28 53 621 A.

[0003] When a lorry or bus has a head-on collision with, for example, another lorry there is a risk that the front part of the cab, together with the instrument panel, are pushed inwards in the direction towards the driver's seat due to the large forces which arise in the collision.

[0004] In the case of lorries which are equipped with an articulated cab, the cab's fixture at the first point between the cab and the vehicle framework is made to be separated in a head-on collision, so that the cab is displaced backwards, in order to reduce thereby the deformation of the cab. This fixture must exhibit good fatigue strength which results in the force from the cab which arises in a collision becoming large before the cab is separated from the first point. Due to the size of this collision force, the front part of the cab and the instrument panel are pushed inwards in the cab before the said separation occurs. The hydraulic cylinder or cylinders which powers the articulation of the cab also contribute to the collision force, acting on the cab, becoming large before the separation occurs.

[0005] It is an objective of the present invention to achieve an arrangement which facilitates the displacement of the driving-space of a vehicle, which arrangement ensures that the driving-space remains essentially intact in the event of a collision.

[0006] This is achieved by means of an arrangement of the type given in the introduction, further comprising the features of the characterizing portion of claim 1.

[0007] Such an arrangement reduces the deformation of the cab when the vehicle collides with a vehicle in front or a barrier. Since the driving-space will remain essentially intact after the collision, the doors of the cab can still be opened, which makes it easier for the driver to get out of the cab.

[0008] The invention is more precisely explained by means of the exemplary embodiments shown in the appended drawings, in which:

Figure 1 shows a vehicle before a head-on collision,
Figure 2 shows a vehicle after a head-on collision
Figure 3 shows an arrangement according to the first embodiment of the present invention before a collision,
Figure 4 shows an arrangement according to the first embodiment of the present invention after a collision,
Figure 5 shows a side view of an arrangement according to the first embodiment of the present invention before a collision, and
Figure 6 shows an arrangement according to a second embodiment of the present invention before a collision.

[0009] In Figure 1 a vehicle 1 is shown in the form of a lorry which comprises a structural framework 2 on which a cab 3 is arranged. The cab 3 is divided into a driving-space 4, an energy-absorbing element 5 and a rear section 6. The rear section 6 can, for example, consist of a sleeping berth or a storage space. The energy absorption element 5 is arranged between the driving-space 4 and the rear section 6 and consists of the bodywork part joined to both the driving-space 4 and the rear section 6, to form a deformation zone. The bodywork section can consist of a plate extending from one side of the driving-space 4 and the rear section 6, over the driving-space 4 and the upper side of the rear section to end at the other side of the driving-space 4 and the rear section 6. The plate can also extend along the floor of the driving-space 4 and the rear section 6. The plate is joined to the rear area of the driving-space 4 and the front area of the rear section 6. The driving-space 4 is arranged to be able to be displaced relative to the framework 2. The rear section 6 is connected to the framework 2 which is described more precisely below. The rear section 6 is thus not able to be displaced relative to the framework 2.

[0010] Figure 2 shows the same vehicle after a head-on collision, when the driving-space 4 has been displaced backwards in the direction of the rear section 6. Since the rear section 6 is firmly fixed to beam section 10, the bodywork part has been compressed during the collision and therefore absorbed the energy which was produced during the course of the collision. The driving-space 4 is essentially intact after the collision. Therefore the bodywork part must be so constructed that it gives way. This can be achieved for example by means of indications in bodywork part.

[0011] Thus, by locating the bodywork part behind the driving-space 3 the whole of the driving-space 4 is displaced backwards essentially intact, which, at the same time, results in the front part of the driving-space 4, the instrument panel and the driver's seat being displaced backwards without the distance between the instrument panel and the driver's seat being reduced. Consequently, the driver is not trapped between the seat and the instrument panel. During the collision the B-post 7 is also displaced backwards, which means that the seat-belt which holds the driver to the driving seat is also displaced backwards, since the seat-belt is arranged in B-post 7.

[0012] Instead of only the bodywork part absorbing the shock, hydraulic dampers (not shown) can supplement the bodywork part 5 as energy-absorbing elements between (the driving-space 4 and the rear section 6. The abovementioned indications in the bodywork part can be constructed so that the course of the deformation can be controlled.

[0013] An arrangement 8 which facilitates the displacement of the driving-space 4 is shown in Figure 3.

The arrangement 8 comprises a first beam section 9, which on the one hand supports the cab 3, and on the other hand is placed on the structural framework 2 via the second beam section 10, which is pivotably arranged on the framework 2, so that the cab 3 can be articulated relative to the framework 2. Articulation of the cab 3 is carried out by means of an articulation cylinder 11 so that the cab 3 and hence the first and second beam sections 9,10 are pivoted at pivot point 12 arranged in the front part of the framework 2. The articulation cylinder 11 is arranged between the framework 2 and the second beam section 10. The first and second beam sections 9,10 are provided with brackets 13,14. The driving-space 4 is attached to bracket 13 and the rear section 6 is attached to bracket 14. In the figure, the cab 3 is indicated with dotted lines. The first beam section 9 is arranged on the second beam section 10 so as to be able to be displaced. According to the exemplary embodiment shown, this is achieved by having the first beam section 9, at least partly, enclosing the second beam section 10, so that the first and second beam sections 9,10 form a telescopic arrangement. Figure 3 shows the arrangement 8 before a collision.

[0014] Figure 4 shows the arrangement 8 according to Figure 3 after a head-on collision where the cab 3 has been subjected to a collision force F as indicated in the figure. The first beam section 9 has been displaced by the collision relative to the second beam element 10 and consequently also relative to the structural framework 2. As a result, the driving-space 4 has been displaced backwards in the direction of the rear section 6 so that the energy-absorbing element 5 between the driving-space and the rear section 6 has been compressed. The energy-absorbing element 5 has thus absorbed the energy which was produced during the collision, as described above.

[0015] In order to join the first and second beam sections 9,10 to each other and thereby prevent vibrations and rattling, the first and second beam sections 9,10 are glued securely to each other. The glue joint should then be dimensioned so that the first and second beam sections 9,10 come loose in the event of a collision.

[0016] Only half of the front part of the vehicle 1 is shown in Figures 3 and 4. Naturally, the beam sections 9,10 are placed on both sides under the cab 3 to obtain good stability.

[0017] A side view of the arrangement according to the first embodiment of the present invention is shown in Figure 5. In the figure, the cab has been lifted away to show how the framework 2 and the beam sections 9,10 are arranged relative to each other.

[0018] The first beam section 9 has a recess 18 which allows the first beam section 9 to be displaced relative to a linkage piece 19 which is connected to the second beam section 10. The pivot point 12 extends through the linkage piece 19 and the framework 2, so that the beam sections 9,10 and hence the cab 3 can be articulated.

[0019] The linkage piece 19 is also fitted with a recess 20 to allow the first beam section 9 to be displaced relative to the linkage piece 19.

[0020] The recess 18 in the first beam section 9 should have a length which allows the bodywork part 5 to be compressed in the event of a collision. For example the bodywork part 5 can be 300 mm long in the lengthwise direction of the vehicle 1. This implies that the recess 18 must be at least 300 mm long. To accommodate the connection of the linkage piece 19 and the fixture of the articulation cylinder 11 to the second beam section 10, the recess 18 must be sufficiently longer than the distance by which the bodywork part 5 is compressed in the event of a collision.

[0021] A second example of an embodiment of the arrangement 8 according to the invention is shown in Figure 6. A mounting piece 15 is arranged on the front part of the second beam section 10, which mounting piece 15 comprises pegs 16 and/or holes 17 which engage with the cab 3, and which are separated from the cab 3 when the driving-space 4 is displaced in the direction of the rear section 6. The mounting piece 15 absorbs the lateral forces from the cab 3 during operation of the vehicle 1 which forces, for example, arise on cornering and thereby contributes to the vehicle 1 having a stiffer lateral structure. The pegs 16 are preferably introduced into the holes 17 with a interference fit which allows for separation in the event of a collision.

Claims

1. Arrangement to facilitate displacement of a driving-space (4) of a vehicle (1), comprising a first beam section (9) which on the one hand supports the driving-space (4), and on the other is arranged as a structural framework (2) for the vehicle (1), and a rear section (6) arranged behind the driving-space (4) which adjoins the driving-space (4) and which is connected to the structural framework (2), so that the rear section (6) is prevented from being displaced in the lengthwise direction of the vehicle (1), wherein the first beam section (9) can be displaced relative to the structural framework (2), so that the driving-space (4) can be displaced in the direction of the rear section (6) under the conditions of a collision, an energy-absorbing element (5) is arranged between the driving-space (4) and the rear section (6) and joined to both the driving-space (4) and the rear section (6), **characterized in that** said energy-absorbing element (5) comprises a bodywork part forming a deformation zone.

2. Arrangement according to Claim 1, **characterized in that** the first beam section (9) is arranged on a second beam section (10) so that it can be displaced, which second beam section is pivotably arranged on the framework (2) so that the driving-space (4) and the rear section (6) can be articulated

relative to the framework (2).

3. Arrangement according to Claim 2, **characterized in that** the first beam section (9) at least partly encloses the second beam section (10) so that the first and second beam sections (9,10) form a telescopic arrangement.

4. Arrangement according to Claim 3, **characterized in that** a mounting piece (15) is arranged on the forward part of the second beam section (10), which mounting piece (15) comprises pegs (16) and/or holes (17) which engage with the driving-space (4), and which are separated from the driving-space (4) when the latter is displaced in the direction of the rear section (6).

Patentansprüche

1. Anordnung zum Vereinfachen der Verschiebung eines Fahrerraums (4) eines Fahrzeugs (1), mit einem ersten Balkenabschnitt (9), welcher einerseits den Fahrerraum (4) lagert und andererseits als struktureller Rahmen (2) für das Fahrzeug (1) angeordnet ist, und mit einem hinteren Abschnitt (6), der hinter dem Fahrerraum (4) angeordnet ist und sich an den Fahrerraum (4) anschließt und mit dem strukturellen Rahmen (2) verbunden ist, so dass der hintere Abschnitt (6) nicht in Längsrichtung des Fahrzeugs (1) verschiebbar ist, wobei der erste Balkenabschnitt (9) relativ zu dem strukturellen Rahmen (2) verschiebbar ist, so dass der Fahrerraum (4) im Falle einer Kollision in Richtung des hinteren Abschnitts (6) verschiebbar ist, wobei ein Energie absorbierendes Element (5) zwischen dem Fahrerraum (4) und dem hinteren Abschnitt (6) angeordnet ist und sowohl mit dem Fahrerraum (4) als auch mit dem hinteren Abschnitt (6) verbunden ist, **dadurch gekennzeichnet, dass** das Energie absorbierende Element (5) einen Karosserieteil aufweist, der eine Deformationszone bildet.

2. Anordnung nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Balkenabschnitt (9) an einem zweiten Balkenabschnitt (10) angeordnet ist, so dass er verschiebbar ist, welcher zweite Balkenabschnitt schwenkbar an dem Rahmen (2) angeordnet ist, so dass der Fahrerraum (4) und der hintere Abschnitt (6) relativ zu dem Rahmen (2) gelenkig bewegbar sind.

3. Anordnung nach Anspruch 2, **dadurch gekennzeichnet, dass** der erste Balkenabschnitt (9) den zweiten Balkenabschnitt (10) zumindest teilweise umgibt, so dass der erste und der zweite Balkenabschnitt (9, 10) eine teleskopische Anordnung bilden.

4. Anordnung nach Anspruch 3, **dadurch gekennzeichnet, dass** ein Anbringstück (15) an dem vorderen Teil des zweiten Balkenabschnitts (10) angeordnet ist, welches Anbringstück (15) Stifte (16) und/oder Öffnungen (17) aufweist, welche mit dem Fahrerraum (4) in Eingriff stehen und welche von dem Fahrerraum (4) trennbar sind, wenn der Fahrerraum (4) in Richtung des hinteren Abschnitts (6) verschoben wird.

Revendications

1. Agencement pour faciliter le déplacement d'un espace de conduite (4) d'un véhicule (1), comportant un premier tronçon de poutre (9) qui d'une part supporte l'espace de conduite (4), et qui d'autre part est prévu en tant qu'ossature structurelle (2) du véhicule (1), et un tronçon arrière (6) agencé derrière l'espace de conduite (4), qui est continu à l'espace de conduite (4) et qui est connecté à l'ossature structurelle (2), de sorte que le tronçon arrière (6) est empêché d'être déplacé dans la direction longitudinale du véhicule (1), le premier tronçon de poutre (9) pouvant être déplacé par rapport à l'ossature structurelle (2), de sorte que l'espace de conduite (4) peut être déplacé dans la direction du tronçon arrière (6) sous les conditions d'une collision, un élément d'absorption d'énergie (5) étant agencé entre l'espace de conduite (4) et le tronçon arrière (6), et étant relié à l'espace de conduite (4) et au tronçon arrière (6), **caractérisé en ce que** ledit élément d'absorption d'énergie (5) comporte une partie de carrosserie formant une zone de déformation.

2. Agencement selon la revendication 1, **caractérisé en ce que** le premier tronçon de poutre (9) est agencé sur un second tronçon de poutre (10) de sorte qu'il peut être déplacé, lequel second tronçon de poutre est agencé de manière pivotante sur l'ossature (2), de sorte que l'espace de conduite (4) et le tronçon arrière (6) peuvent être articulés par rapport à l'ossature (2).

3. Agencement selon la revendication 2, **caractérisé en ce que** le premier tronçon de poutre (9) renferme au moins partiellement le second tronçon de poutre (10), de sorte que les premier et second tronçons de poutre (9, 10) forment un agencement télescopique.

4. Agencement selon la revendication 3, **caractérisé en ce qu'**une pièce de montage (15) est agencée sur la partie avant du second tronçon de poutre (10), laquelle pièce de montage (15) comporte des chevilles (16) et/ou des trous (17) qui viennent en prise avec l'espace de conduite (4), et qui sont séparés de l'espace de conduite (4) lorsque ce dernier

est déplacé dans la direction du tronçon arrière (6).

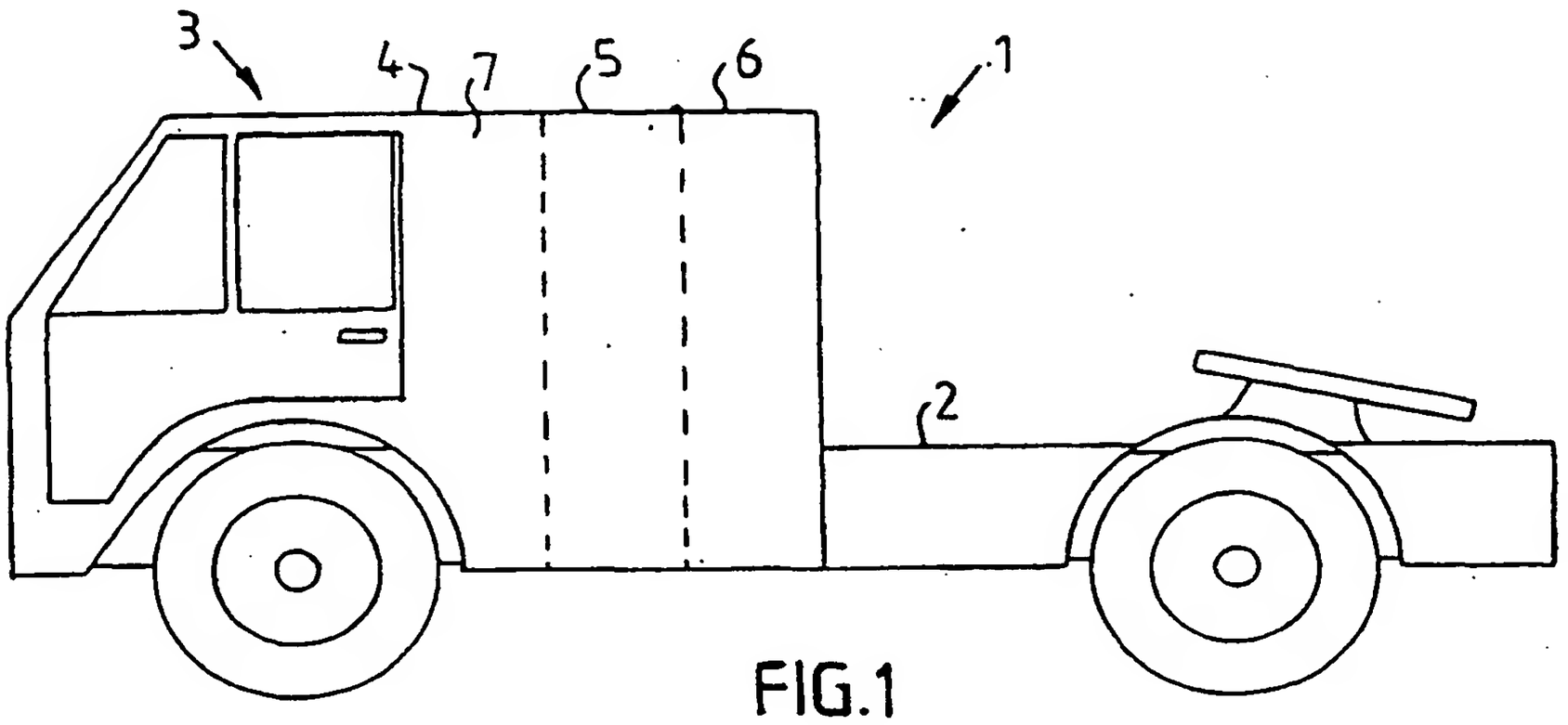

FIG.1

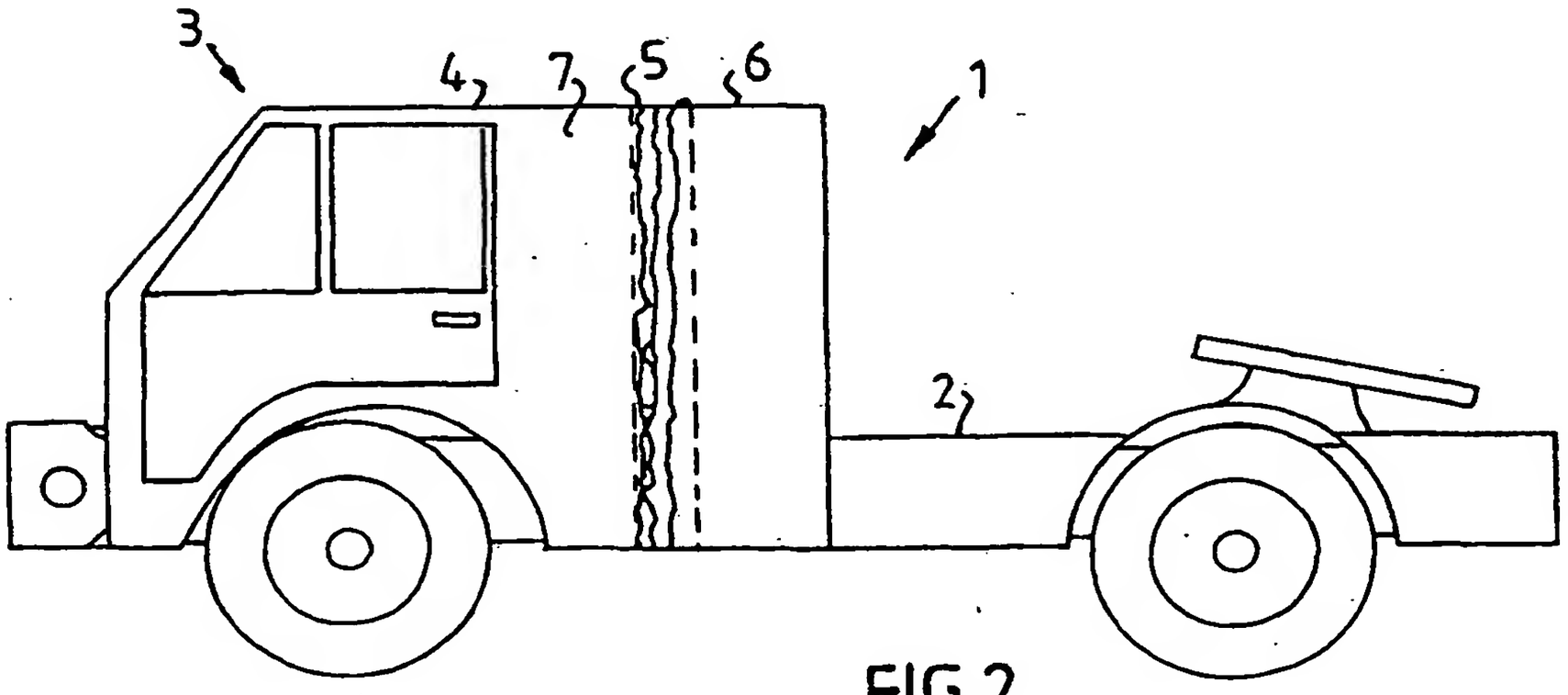

FIG.2

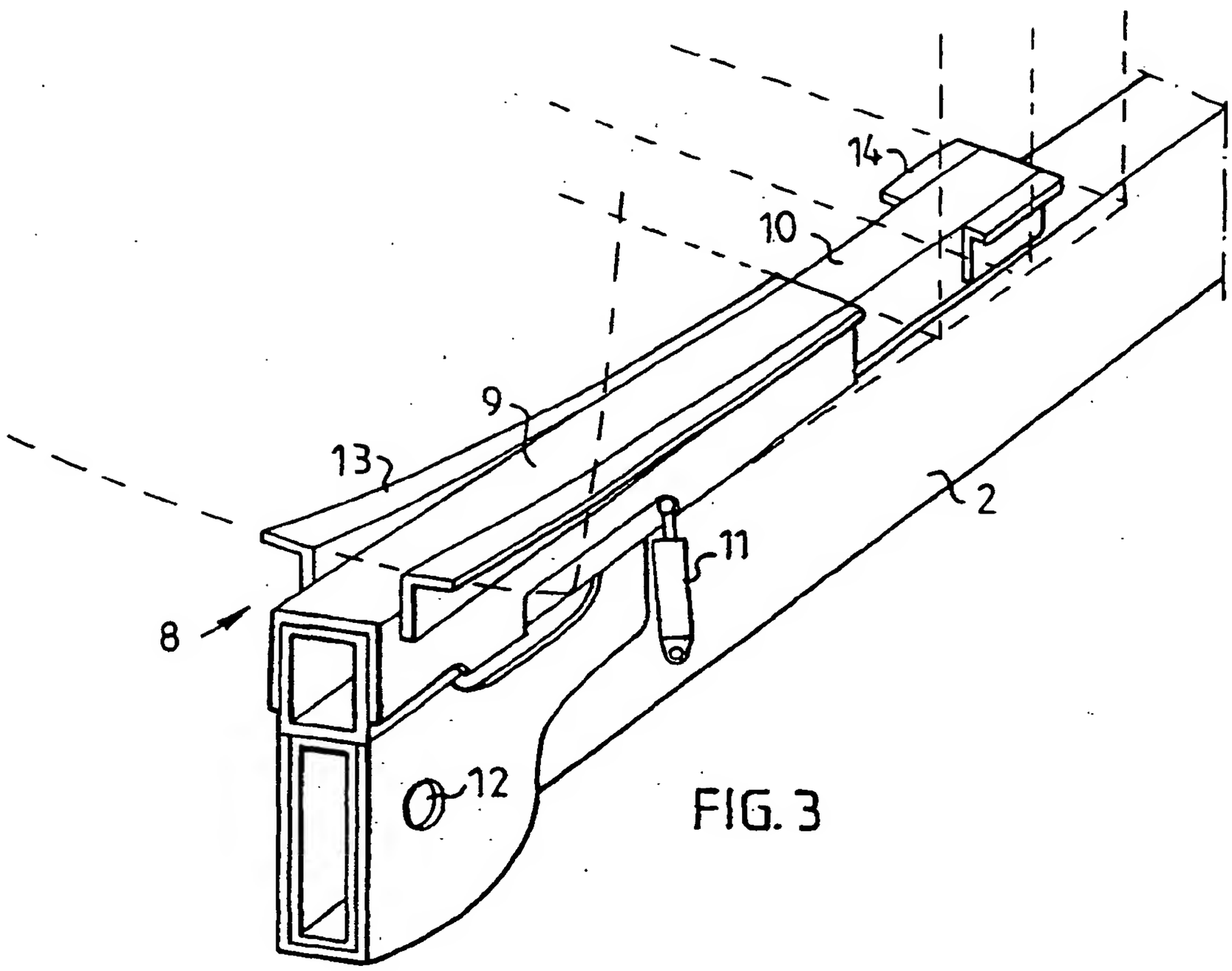

FIG. 3

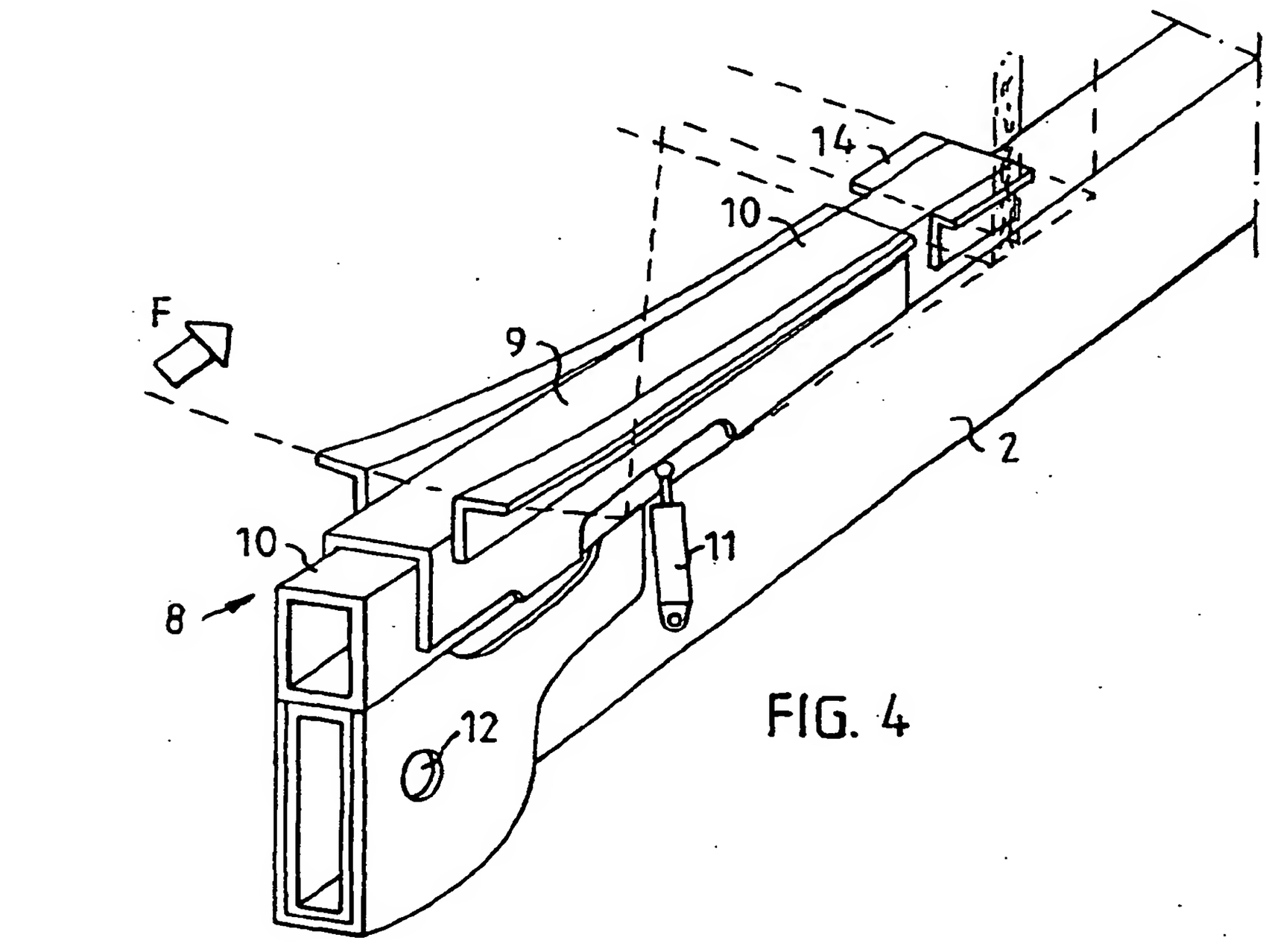

FIG. 4

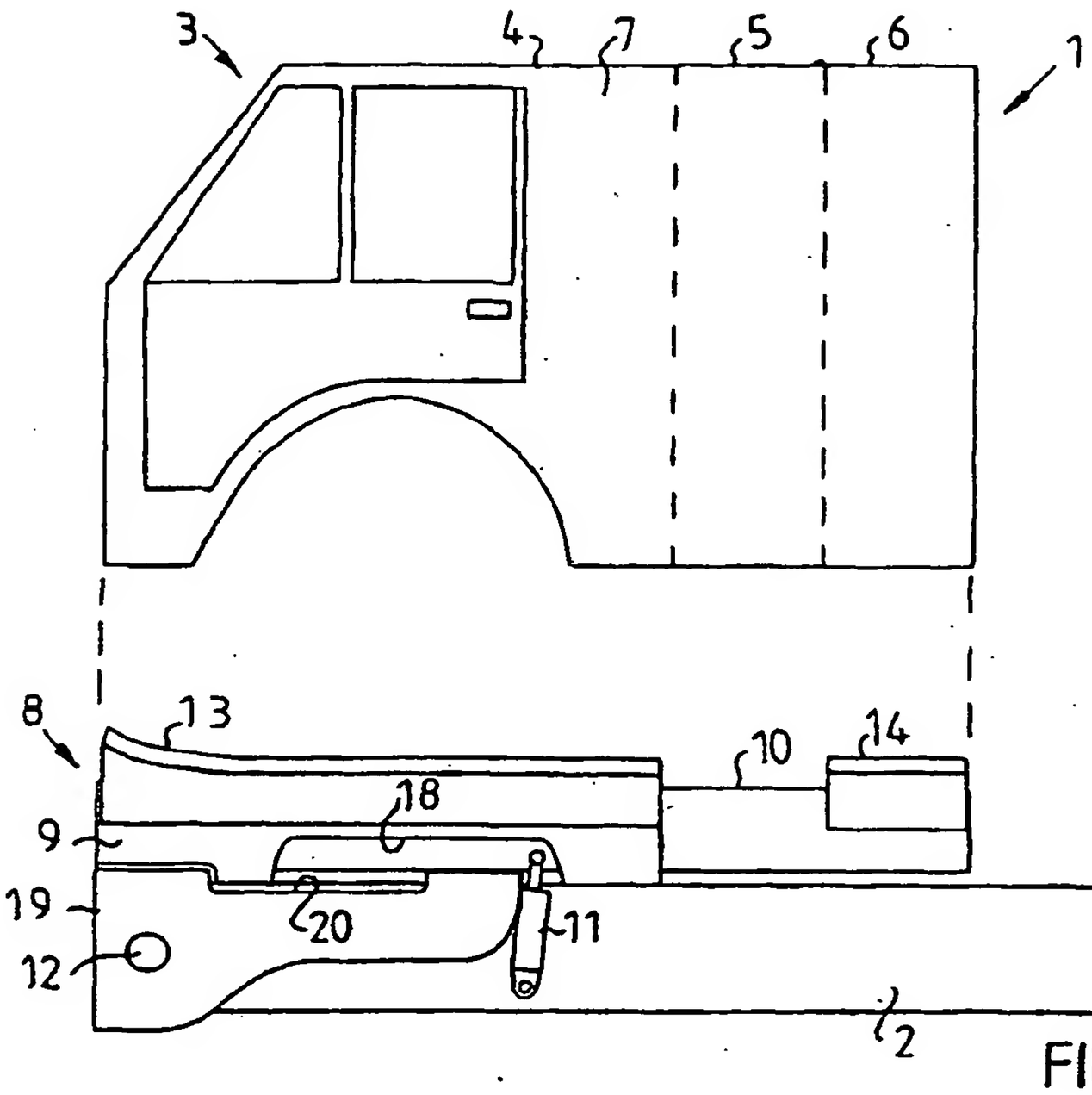

FIG.5

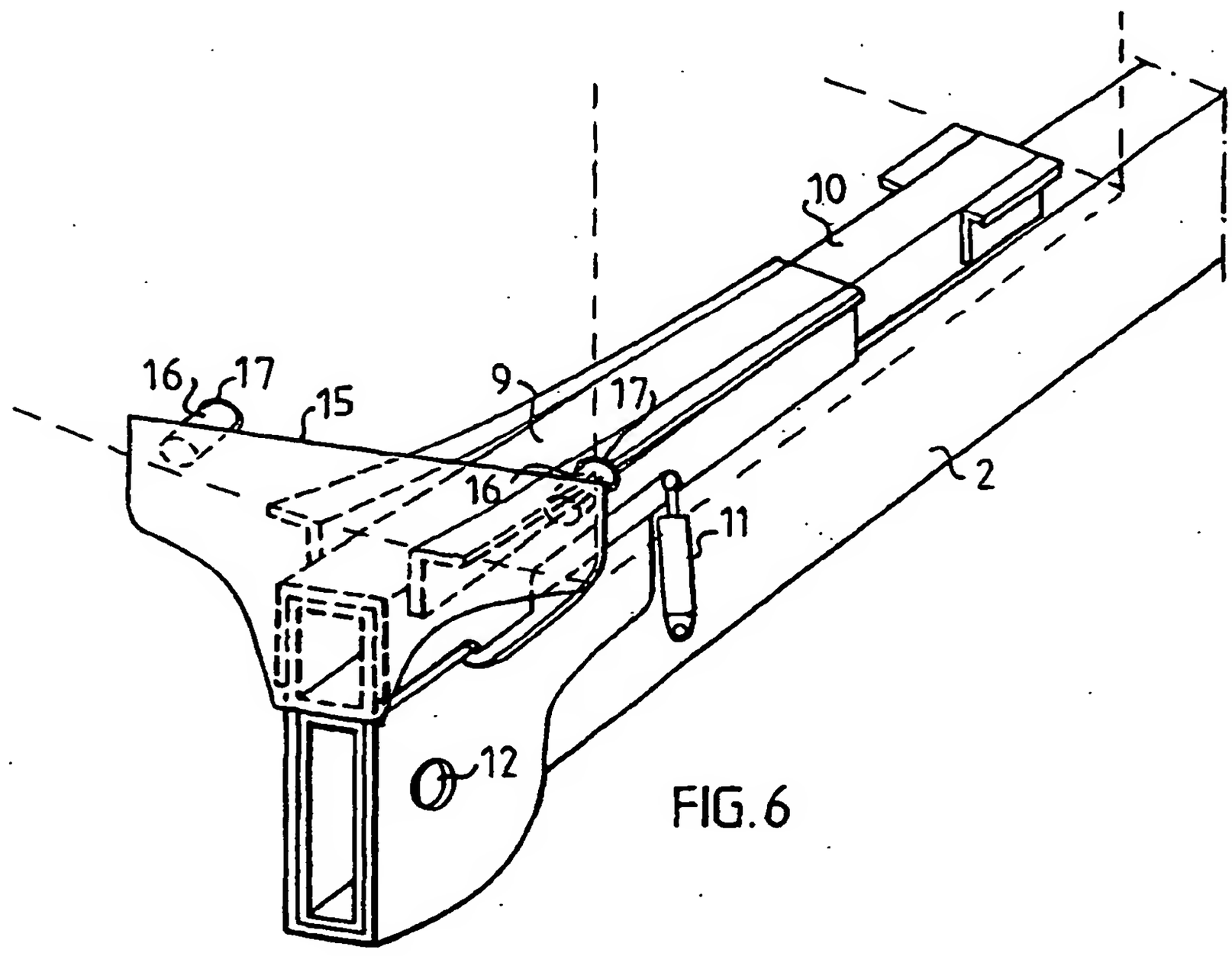

FIG.6